Student Introduction

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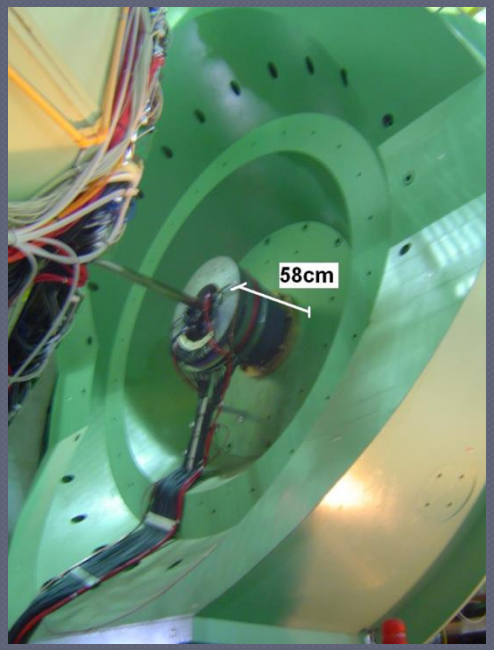
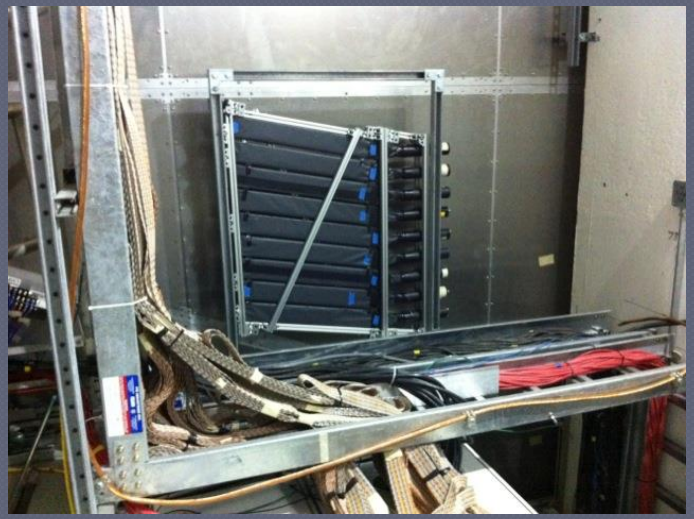
Introduction

- From:
  - Dallas, Texas
- Undergrad:
  - Abilene Christian University ('05-'09)
  - Worked on PHENIX summer '06, '07
- Grad School:
  - University of Illinois at Urbana-Champaign ('09-present) under Matthias Grosse Perdekamp
  - Work:
    - Local UIUC RPC r&d
    - RPC assembly(St. 1) and operation (Run 13)
    - Run 13 $W \rightarrow \mu$ A_L analysis

Slideshow!



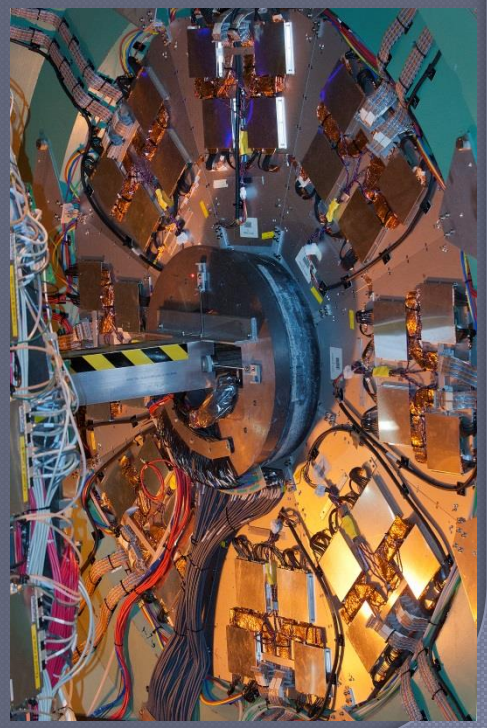
RPC 1
Before/After
Installation



RPC 3 “Efficiency”
Hodoscope

Slideshow!

RPC 1
Before/After
Installation



My Analysis: Run 13 $W \rightarrow \mu$ A_L

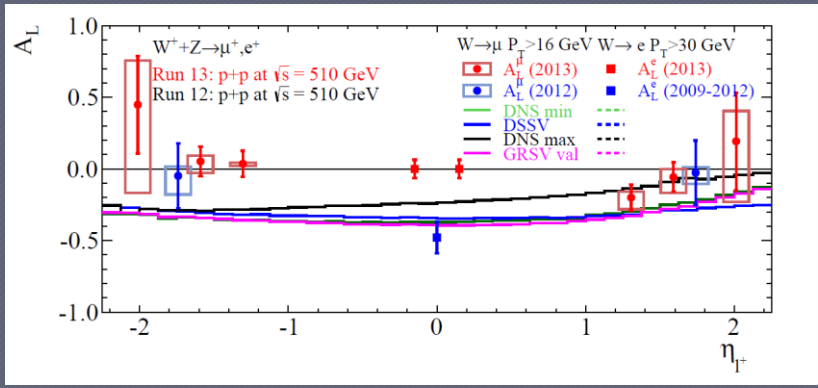
- Goal:
  - Better constrain separate q and $\bar{q}$ contributions to longitudinal proton spin
- Channel:
  - $q\bar{q} \rightarrow W^{\pm} \rightarrow \boldsymbol{\mu}\nu_{\mu}$ (at forward rapidity)
  - Weak interaction: parity violation
    - Constrains possible quark helicities giving a simplified $A_L \sim \Delta q, \Delta\bar{q}$ relation

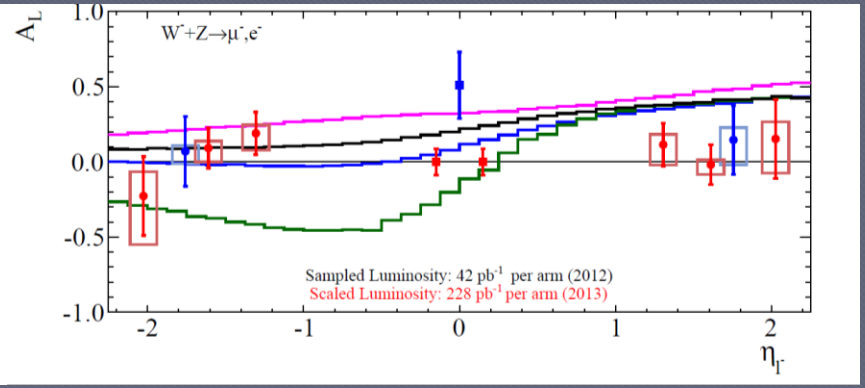
$$A_L^{W^+} = \frac{-\Delta u(x_1)\bar{d}(x_2) + \Delta\bar{d}(x_1)u(x_2)}{u(x_1)\bar{d}(x_2) + \bar{d}(x_1)u(x_2)} \qquad A_L^{W^-} = \frac{-\Delta d(x_1)\bar{u}(x_2) + \Delta\bar{u}(x_1)d(x_2)}{d(x_1)\bar{u}(x_2) + \bar{u}(x_1)d(x_2)}$$

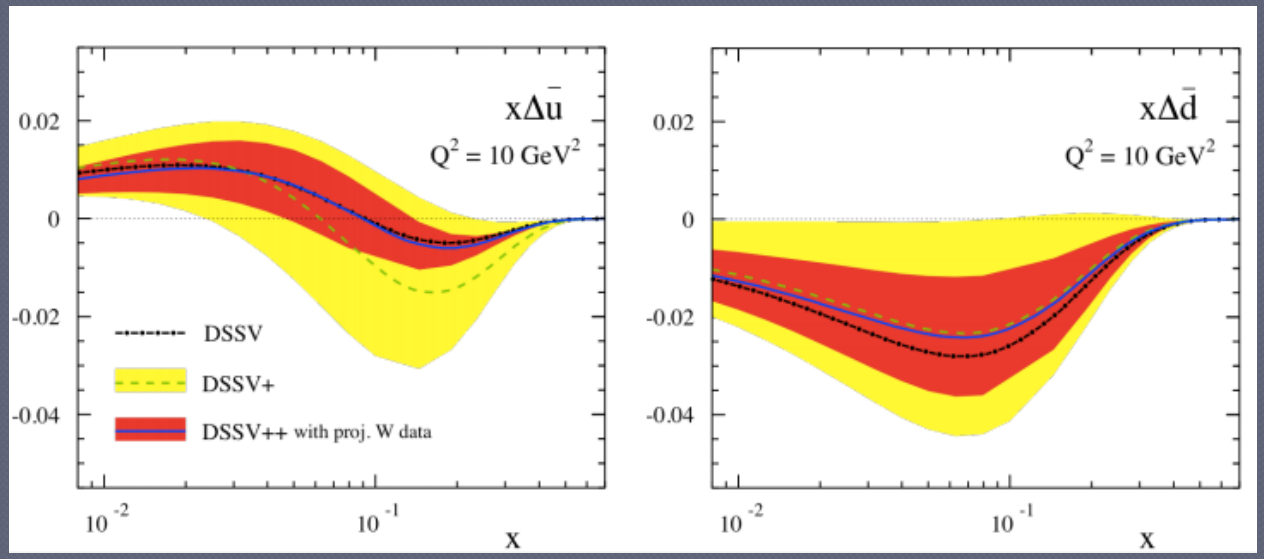
My Analysis: Run 13 $W \rightarrow \mu A_L$

- Challenge
  - Background dominance!
- Technique
  - Likelihood ratio (W_{ness})
    - Use signal/background differences in many variables to select a subset of data with more relative signal
  - Maximum Likelihood Signal/Background fit
    - Characterize remaining sig/bkg ratio to correct asymmetries

My Analysis: Run 13 $W \rightarrow \mu$ A_L







Bonus: Claim to fame

PHENIX Themed

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- First cake featured in the elog
- http://logbook2.phenix.bnl.gov:7815/Run+13+Log/3323